

THE AMPHIBIOUS GROUP OF POLYGONUM, SUBGENUS  
PERSICARIA.

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*(Continued from p. 112.)*

## II. THE AMERICAN AMPHIBIOUS PERSICARIAS.

The systematic position of the semi-aquatic or amphibious members of the genus *Polygonum* in America has long been a vexed question. The existence of at least two species, each varying widely in its characters in accordance with its ability to maintain itself in most diverse situations, has been generally recognized. One of these is generally cited as identical with the *P. amphibium* L. of Europe; the other as *P. Muhlenbergii* (Meisn.) Wats. or *P. emersum* (Michx.) Britton. Besides these, the existence of some 45 species less generally recognized has been asserted by Greene, Nieuwland and others.

In advance of the somewhat lengthy discussion necessary to present the point of view in its entirety, and to indicate the trend of the discussion itself, it may be said that the proposition advanced by the portions of this paper dealing with the systemy and floral characters of the amphibious Polygonums is to indicate the existence on this continent of two principal species: one, to be referred to as *P. natans* (Michx.) A. Eaton, much resembling but not identical with the European *P. amphibium* L.; the other as *P. coccineum* Muhl., which in the opinion of the writer is an earlier valid binomial designation of the plant generally called *P. Muhlenbergii* (Meisn.) Wats. and *P. emersum* (Michx.) Eaton. It has previously<sup>1</sup> been advanced as a conjecture supported by a certain amount of presumptive evidence that the great variability manifested by these plants, which has caused so much uncertainty as to their positions and identities, is due not only to their unusual adaptability to varied conditions of habitat—factors which certainly play no small part in the situation—but also, in some sections of the country at least, to more or less frequent cross-breeding between two species closely related and, as compared with the majority of their congeners, unusually adapted to cross-fertilization; the results of these crossings being seen in individuals in which the parental characters are more or less blended, and which have a faculty less strongly developed in other groups of the genus of perennating to

<sup>1</sup> Stanford, RHODORA, xxvii. 81-89 (1925).

a practically unlimited extent by means of rhizomes and rhizomatic stems, while their flowers show a percentage of sterility which is almost unique among the well recognized species of *Polygonum*. Inasmuch as the final proof of this conjecture may be considered to require further studies which are beyond the scope of the present paper, it is not proposed, on the basis of that speculation, to change the rank or nomenclature of any member of the group which has recognizably distinct characters and demonstrated range. As to the existence of *P. amphibium* on American shores, it may be said that a single Nova Scotian specimen in the Gray Herbarium shows the existence of a colony (doubtless introduced) in that province, and it is not improbable that if collectors take cognizance of the characters by which *P. amphibium* may be differentiated, other stations may be discovered. For that reason, as well as the necessity of establishing the position of *P. natans* in American *Polygonum* history, some attention will be devoted to the European species in the discussion which follows.

In view of the great variability, whatever its cause, existing in these plants, it is no wonder that the accounts of the early American floristic writers are, in their brevity, often unsatisfactory, or that these writers themselves occasionally used a term applicable to one species to designate the other. The following resumé is not intended to be encyclopedic, but merely to indicate the points of view of the principal writers who have described these plants and to trace as far as possible the identity of the material to which reference was made.

Walter<sup>1</sup> notes as "*P. Bistorta?*" a plant which Pursh<sup>2</sup> and Meisner,<sup>3</sup> the former doubtfully, refer to that here treated as *P. coccineum*. The "*floribus albis*" of Walter appears rather a serious discrepancy; Elliott in 1817 referred Walter's problematical plant to *P. virginianum* L.; this, in view of the white flowers and the territory covered by Walter's work, seems a more probable conjecture. Michaux<sup>4</sup> under *P. amphibium* L. described

"*Var. a. natans*: foliis natantibus, oblongo-ovalibus:  
spica ovoidea, glabra.  
—*β. emersum*: foliis ovali-lanceolatis, erectis, minutim  
pubentibus: spica oblonga.

<sup>1</sup> Walter, Fl. Carol. 131 (1788).

<sup>2</sup> Pursh, Fl. Am. Sept. i. 271 (1814).

<sup>3</sup> Meisn. Mon. Gen. Polyg. Prodr. 67 (1826) and in DC. Prodr. xiv. 116 (1856).

<sup>4</sup> Michx. Fl. Bor.-Am. i. 240 (1803).

Hab.  $\alpha$ . in lacu *S. Joannis*.  
 $\beta$ . ad ripas fluminis *Ohio*."

Here we have succinctly the typical form of each of the two principal American species: *P. natans* (Michx.) Eaton, with its floating glabrous leaves and short panicles, and *P. coccineum* Muhl., with pubescent lanceolate leaves and longer panicles.

Willdenow<sup>1</sup> as a footnote under *P. amphibium* L. inserted the following:

"Similis species in America boreali etiam amphibia occurrit.

POLYGONUM *coccineum*.

*P. floribus pentandris semidigynis, spica cylindracea, ochreis truncatis glabris, foliis ovatis.*

*Polygonum coccineum Mühlenberg in litt.*

$\alpha$ . *aquaticum foliis ovato-ellipticis obtusis.*

$\beta$ . *terrestre foliis ovato-oblongis acuminatis.*

*Habitat in Pennsylvania. 2.*

*Folia varietatis terrestris tripollicaria et sesqui pollices fere lata. Spica coccinea bipollicaris cylindrica."*

*Polygonum coccineum* Muhl., then, is to be considered the first published binomial, and therefore valid for the plant with ovate-lanceolate leaves and cylindric panicle, later reduced by Meisner<sup>2</sup> to *P. amphibium* var. *Muhlenbergii*, raised again to specific rank by Watson.<sup>3</sup> For this plant also Michaux's varietal name was combined as *P. emersum* by Britton.<sup>4</sup>

The "var.  $\alpha$  *natans*" of Michaux resembles very closely the aquatic form of the *P. amphibium* of Europe, and by most authors has been considered identical with it. Amos Eaton<sup>5</sup> published

"*Polygonum natans* (floating knotweed. Whiting's Pond. r. Au. 2.) stamens 5: styles 2, or half 2-cleft: leaves lanceolate, glabrous, near the tops of the stem; petiole filiform, half as long as the leaf: stipules not ciliate: peduncle of the spike smooth: stem very long, lax, filiform, submersed-floating, leafless under water and rooting. Stems generally brown, often 10 to 15 feet in length and from the eighth to the sixteenth part of an inch in diameter; though generally larger and not so long. It is the *P. amphibium*. Var *natans* of Mx. and a variety of the *coccineum* of Willdenow. But it appears sufficiently distinct for a species. It grows plentifully in Whiting's Pond, 5 miles south of New-Lebanon springs [N. Y]."

<sup>1</sup> Willd. Enum. Pl. 428 (1809).

<sup>2</sup> Meisn. in D.C. Prodr. xiv. 166 (1856).

<sup>3</sup> Watson, Proc. Am. Acad. xiv. 295 (1879).

<sup>4</sup> Britton, Trans. N. Y. Acad. Sci. viii. 73 (1889).

<sup>5</sup> Eaton, Man. ed. 3: 400 (1822).

This description appears unchanged in Eaton's 4th edition (1824). In the 5th (1829) Eaton for the first time admitted:

"*amphibium* L. . . . upper leaves sub-sessile and tapering to the base; middle ones short-petioled and abrupt at the base, lance-oblong and ovate-oblong, gradually tapering to a long-acuminate apex, rough at the edge: spike cylindrical: stem thick, erect, sub-decumbent at the base. Flowers large, red, in a thick spike 2 to 3 inches long. In mud and moist ground."

*P. coccineum*, which had been accorded a very brief mention in the three previous editions, is next described more fully:

" . . . leaves long-petioled, oblong, abrupt and subcordate at the base, acute at the apex, glabrous and lucid; spike cylindrical; stem thick and strong, decumbent and rooting. Flowers red, in spikes not so long or so thick as the last. Stem creeps along the muddy banks of an island in the Hudson, above Troy, from 6 to 12 feet."

The former *P. natans* next appears as *P. fluitans*, with the description recast:

" . . . leaves long-petioled, oblong-oval, tapering to the base, obtuse and acute at the apex, glabrous and lucid: stem filiform, wiry, floating, sometimes rooting: spike cylindric. Flowers red, in spikes less than half as long as the last, and not a fourth as large as the preceding. Stem 10 to 15 feet long, often dark brown and sending off rootlets in clear water. Grows in Whiting's Pond, Columbia County, and in Botany Pond, three miles east of Albany. I have watched this and the two preceding species several years, and am satisfied, they are distinct. Finding this to be a new one, not var. *natans* of Mx. I give it a new name."

The three are further differentiated by the terms: "mud knotweed," "creeping knotweed," and "swimming knotweed." From footnotes we further learn that Eaton considered "*P. amphibium*" to be "var. *terrestre* T. (orr)"; his "*P. coccineum*" as "*amphibium*, Var. *natans* Mx." and the rechristened "*P. fluitans*" as "*amphibium*, Var. *natans*, 3d. ed. Manual and Var. *aquaticum* T." The remainder of Eaton's works, including the 8th edition (the "North American Botany," of Eaton and Wright) present the same views. Eaton's "*P. amphibium*" is evidently a vigorous example of the variable *P. coccineum*. To one who has devoted any considerable time to this group of plants, it will not appear remarkable that Eaton became somewhat confused about them; the wonder, if any, is that he made no more species. The fact remains that, in the third edition of his Manual, in 1822, he published a binomial to which the North American

analogue of *P. amphibium* L. can be referred. "*P. fluitans*," later taken up by Greene as one of his numerous "species" cannot be held a valid designation.

Among other early American writers Torrey<sup>1</sup> listed *P. amphibium*  $\alpha$  *terrestre* (*P. amphibium*  $\beta$ . *emersum* Michx. as syn.) and  $\beta$ . *aquaticum* (*P. amphibium*  $\alpha$  *natans* Michx. and *P. natans* Eaton as syns.). As to the  $\alpha$  *terrestre*, he states:

"The *P. amphibium* of this country is considered as a distinct species from the European plant by *Willdenow* and some other authors, but I am unable to discover any essential difference between them, except in the latter the leaves (of the var  $\alpha$ ) are scabrous."

As to the  $\beta$ . *aquaticum*:

"This can hardly be considered a distinct species, as it is sometimes found passing into the variety  $\alpha$ . The European plant appears identical with ours."

Bigelow<sup>2</sup> described what is evidently *P. coccineum* Muhl. as *P. amphibium*:

" . . . leaves oblong-lanceolate, acute, rough at the edge; spike cylindrical . . . ."

Distinct from the following species [*Polygonum coccineum* Willd.] by its leaves, which are generally lanceolate, though sometimes rounded at the base, the edges ciliate-serrulate, so as to feel rough, the veins having also sometimes the same character . . . .

It agrees perfectly with European specimens."

Under *P. coccineum* Willd. (*P. amphibium*  $\alpha$  *natans* Michx. as syn.) he writes:

" . . . a more perfectly aquatic species than the last, better distinguished from it by the entire smoothness of its leaves than by the characters usually given . . . ."

The treatment in Bigelow's third edition (1840) is a repetition.

Gray, in the first edition of his Manual (1848) reduced "*P. coccineum* Bigel." and "*P. fluitans* Eaton" to "**P. amphibium** L. var. 1 **AQUATICUM** L." and described as "Var. 2. **TERRESTRE** Torr." a form "More or less hairy or bristly, with an upright or ascending stem . . . the leaves acute or pointed, upper very short-petioled . . . ." The range given is "New England to Wis., the var. 1 chiefly northward." "Very variable in foliage, &c.: spike 1'-3' long, rose red." The description was considerably recast in the

<sup>1</sup> Torr. Fl. No. and Mid. U. S. i. 403 (1824).

<sup>2</sup> Bigelow, Fl. Bost. ed. 2: 157 (1824).

fifth edition (1867) with the note that "Var. TERRESTRE Willd., grows in shallow water, or in wet soil, or even 'in sandy prairies' in Illinois (*Dr. Mead*) either almost glabrous or strigose-hirsute, . . . "

Among the early European treatments which mention the American plants Sprengel<sup>1</sup> introduced *P. coccineum* Muhl. into his edition of the *Species Plantarum*. Meisner<sup>2</sup> listed the aquatic form as *P. amphibium*  $\alpha$  *natans* and the other as  $\beta$  *terrestre*, citing in addition to Muhlenberg (in Willdenow) and Pursh the *Species Plantarum* of Willdenow (1799) (which referred only to the European plant), showing that Meisner then regarded the forms of the two continents as identical. In his later and more extensive work<sup>3</sup> Meisner does not refer to " $\gamma$  *terrestre*" in America, but proposes as " $\epsilon$  *Muhlenbergii*" the *P. coccineum* Muhl. which he now regards as distinctly American. It is not necessary in the present connection to discuss later European literature.

(To be continued.)

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## NOTES ON SAGINA

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IN ordering the material of *Sagina* in the Gray Herbarium it has been found desirable to distinguish two forms which are not ordinarily recognized in America. These may be very briefly noted as follows.

**SAGINA micrantha** (Bunge), n. comb. *Spergula micrantha* Bunge in Ledeb. Fl. Alt. ii. 183 (1830). *Sagina Linnaei*,  $\alpha$  *micrantha* (Bunge) Fenzl in Ledeb. Fl. Ross. i. 339 (1841). *Sp. semidecandra* Turcz, ex Ledeb. l. c. (1841).

This Asiatic species occurs also on the Aleutian and adjacent islands and the islands of Bering Sea. The following are referred here. ALASKA: St. Paul Island, *J. M. Macoun*, nos. 39, 89,644; Attu Island, *J. M. Macoun*, no. 38; Unga Island, *M. W. Harrington*.

**S. SAGINOIDES** (L.) Dalla Torre. The typical plant of the Arctic and of Eurasia has the sepals 2-3 mm. long, the capsules 3.4 mm. long. This extreme occurs southward rather locally to Gaspé Co., Quebec, and in western America to New Mexico and California, but most material of western North America stands apart in having the sepals only 1.3-2 mm. long. This American extreme may be called

<sup>1</sup> Spreng. Syst. ii. 239 (1825).

<sup>2</sup> Meisn. Mon. Gen. Polyg. Prodr. 67 (1826).

<sup>3</sup> Meisn. in DC. Prodr. xiv. 115 (1856).